

PARAPHAULOPPIA (ACARIDA: CRYPTOSTIGMATA: ORIBATULIDAE) AND ITS OCCURRENCE IN SOUTH AUSTRALIAN SOILS

by D. C. LEE* & C. M. BIRCHBY†

Summary

LEE, D. C. & BIRCHBY, C. M. (1991) *Paraphauloppia* (Acarida: Cryptostigmata: Oribatulidae) from South Australian soils. *Trans. R. Soc. S. Aust.* 115(4), 189-198, 29 November, 1991.

Paraphauloppia Hammer is redefined and compared with other oribatulid genera. The description of *Paraphauloppia novaezealandica* Hammer is extended and four species are described: *Paraphauloppia acutinoctata* sp. nov., *P. globata* sp. nov., *P. obtusinoctata* sp. nov., *P. trifurcata* sp. nov. These mites are from soil and plant litter or moss at four of nine sites sampled in South Australia. A key to adults is given for these five species: this is the first record of *Paraphauloppia* from Australia.

KEY WORDS: *Paraphauloppia*, *Paraphauloppia acutinoctata*, *Paraphauloppia globata*, *Paraphauloppia obtusinoctata*, *Paraphauloppia novaezealandica* Hammer, *Paraphauloppia trifurcata*, new species, Australia, plant litter, soil.

Introduction

Paraphauloppia Hammer, 1967 is examined as part of a current study of sarcoptiform mites in South Australian soils, sampled from nine florally diverse sites, and for which Lee (1987) provided an introduction to the relevant work on the advanced oribatid mites (Planofissurac).

Paraphauloppia is allied to *Oribatula* Berlese, 1895, *Phauloppia* Berlese, 1908, *Zygoribatula* Berlese, 1916 and *Jornadia* Wallwork, 1984 within the Oribatulidae Thor, 1929, which is applied here to a taxon approximating to the Oribatulinae of Balogh & Balogh (1984). The Oribatulidae in this restricted sense have been subdivided into the Oribatulinae, Pseudoppiinae Mahunka, 1975 (see Lee 1987) and Fovoribatulinae Lee & Birchby, 1991. The Fovoribatulinae have since been transferred to the Crassoribatulinae, when the latter was newly given family rank (Lee 1991). The original definition of *Paraphauloppia* is modified to accommodate the new species and distinguish it from *Jornadia*, but also to delineate it from similar family-group taxa, because the definition of the Oribatulinae as currently used is unpublished (Lee in prep.). *P. novaezealandica* Hammer, 1967 is newly recorded from Australia, and four new species are described from South Australia.

Materials and Methods

New material examined here, collected by D.C.L., is deposited mostly in the South Australian Museum (SAMA), but also in the British Museum (Natural History) London (BMNH), the Field Museum,

Chicago (FMNH) and the New Zealand Arthropod Collection, D.S.I.R., Auckland (NZAC), whilst previously described material is deposited in the Zoological Museum, Copenhagen (ZMC). The morphological notational system follows Lee (1987), the somal chaetotaxy of which is summarized in Figs 5 and 6, with the total setae present in each file (eg. 6Z) indicated by number coming first, whilst a particular seta (eg. Z6) would have the number last. The abbreviations for zoogeographical regions follow Lee (1970, fig. 427). The descriptions of eggs refer to those within the female soma. All material was examined using a Nomarski interference contrast device. All measurements are in micrometres (μ m) and were made using an eyepiece micrometer at $\times 250$ magnification.

Systematics

Paraphauloppia Hammer

Paraphauloppia Hammer, 1967, p. 45 (type species by monotypy: *Paraphauloppia novaezealandica* Hammer, 1967); Coetzer, 1968, p. 58; Balogh & Balogh, 1984, p. 272; Luxton, 1985, p. 68.

Definition: Hysteronotum with 10 pairs (2I, 6Z, 2S) of setae and three or four pairs of multiporose foramina, pteromorphs absent. Dorsosejugal furrow entire (sometimes faint), arched, not extending forward to level of setae j2. Proteronotum without translamella, prelamella, sublamella or tutorium, narrow costate lamella (between setae α 1- α 2) present. Ventrosejugal apodeme forming single, continuous bar across midsternal line. Coxite seta IV1 about level with JZg1. Genital shield with three or four pairs of setae. Discidium forms low costate ridge. Femora I and II with five setae (0,2/2,1). Tarsi long (total

* South Australian Museum, North Terrace, Adelaide, S. Aust., 5000

† State Herbarium, North Terrace, Adelaide, S. Aust., 5000

length of tarsi I, II, III and IV more than 7.5% of idiosomal length) and slim (height less than 33% of length). Pretarsus with three claws, usually lateral claw conspicuously slimmer than central claw (exception *P. triforata* sp. nov., all three claws slim).

General morphology: Soma length range for adults: 259–650 (South American species larger; 330–650; South Australian species smaller, 259–365). Soma chaetotaxy: 2j, 2z, 1s; 2J, 6Z, 2S; 3I, III, 3III, 3IV; usually 4JZg (exception: *P. novaezealandica* Hammer, 3JZg), 1Sg; 2JZa, 3Sa. Leg chaetotaxy (solenidia in parentheses): I – 1, 5, 3(1), 4(2), 20(2); II – 1, 5, 3(1), 4(1), 16(2); III – 2, 3, 1(1), 3(1), 16(2); IV – 1, 2, 2, 3(1), 12. Integument mainly smooth, cerotegument inconspicuous, sometimes (Australian species except *P. novaezealandica* Hammer) fine longitudinal lines in coxite region. Hysteronotal setae setose, weakly pilose, seta z2 clavate or globose. Subpedal and circumpedal ridges merged into single continuous line. Femora lack ventral flanges, femur I without caput collar.

Distribution: South America (Nlc; Argentine, Bolivia, Chile, Peru), Australia (Aa; South Australia) and New Zealand (An; South Island). Within South Australia, *Paraphauloppia* is recorded from four sites each representing a habitat type (mallee-broombush, mallee-heath, savannah woodland, sclerophyll forest) with native vegetation and in a Mediterranean-type climatic region. In South America and New Zealand *Paraphauloppia* occurs in moister, cooler regions. Therefore, despite its absence from the South Australian most southerly, moist, coastal site, *Paraphauloppia* probably also occurs in the moister, temperate environments of Australia.

Remarks: *Paraphauloppia* was considered similar to *Subphauloppia* Hammer, 1967, and so to *Phauloppia* Berlese, 1908, when it was established with one species from New Zealand (An). Now, it could be considered most similar to *Jornadia* Wallwork, 1984, known from North and South America, which differs in having five genital setae. Coetzer (1968) included in *Paraphauloppia* a further eight of Hammer's South American species (that had been grouped in either *Oribatula* Berlese, 1895 or *Eporibatula* Sellnick, 1928). One of these species, *P. australis* (Hammer, 1962), has since been mistakenly used (Balogh & Balogh, 1984, fig 70) in order to illustrate *Eporibatula*, despite its being excluded from that genus in the same publication on the basis of having ten pairs of hysteronotal setae. Until the present publication, no other changes have been made to the genus. A paper (Lee

1991) on the higher classification of the Oribatoidea, however, gives more weight to the presence of a central gap in the ventrosejugal apodeme in delineating subfamilies. Consequently, *Diphauloppia* Balogh & Balogh, 1984, *Gerleubia* Coetzer, 1968 and *Subphauloppia* were transferred from the Oribatulinae to the Pseudoppiinae, so that although previously regarded as similar to *Paraphauloppia*, they are now included in another subfamily. Thus *Paraphauloppia* and *Jornadia* are the only oribatuline genera with ten pairs of hysteronotal setae, all the others having 11–14 pairs. *Paraphauloppia cordylinosa* Higgins & Woolley, 1975 is listed in the North American fauna by Marshall *et al.* (1987), noting it as a problematic combination; since it has at least 12 hysteronotal setal pairs it is excluded here from *Paraphauloppia*.

South Australian and South American species of *Paraphauloppia* differ. The South American species are larger, except for *P. gracilis* (Hammer, 1958), which is similar to *P. novaezealandica* in soma shape, size and form of notal setae, and positioning of notal seta S5 behind Z4. The South American species also have smaller sensory setae (z2) and hysteronotal foramina, and lack fine striations on their coxites.

Paraphauloppia includes 13 species: *P. altimontana* (Hammer, 1958); *P. acutinatata* sp. nov.; *P. altimontanoides* (Hammer, 1958); *P. australis* (Hammer, 1962); *P. globata* sp. nov.; *P. gracilis* (Hammer, 1958); *P. magniporosa* (Hammer, 1958); *P. morenoi* (Hammer, 1962); *P. novaezealandica* Hammer, 1967 (type-species); *P. obtusinatata* sp. nov.; *P. pisacensis* (Hammer, 1961); *P. quadrisetosa* (Hammer, 1961); *P. triforata* sp. nov.

Key to Australian *Paraphauloppia* species (adults)

1. Hysteronotal setae shorter (Z3 and Z4 not reaching Z2 or S5) (Fig. 7). Ventrosejugal apodeme well separated from margin of genital orifice, distance between setae III–JZg1 at least as great as length of coxite seta III (Fig. 8). 2
Hysteronotal setae longer (Z3 and Z4 reaching Z2 or S5) (Fig. 1). Ventrosejugal apodeme abutting onto margin of genital orifice or close to it, distance between setae III–JZg1 less than length of coxite seta III (Fig. 3). 3
2. Larger soma (length > 300 µm). Three pairs of genital setae. Four pairs of hysteronotal foramina. Notal setae j2 and z1 shorter than Z2 or Z3.
..... *P. novaezealandica* Hammer, 1967
Smaller soma (length < 300 µm). Four pairs of genital setae. Three pairs of hysteronotal foramina. Notal setae j2 and z1 longer than Z2 or Z3 (Fig. 8).
..... *P. triforata* sp. nov.
3. Larger soma (length > 350 µm). Hysterosoma subglobular. Hysteronotal setae long (Z3 length at

- least $2 \times$ distance Z3-Z2) (Fig. 2).....*P. globata* sp. nov.
 Smaller soma (length $< 350 \mu\text{m}$). Hysterosoma ovoid.
 Hysteronotal setae medium length (Z3 length $1.00 \times - 1.33 \times$ distance Z3-Z2) (Fig. 1).....4
 4. Front of rostrum (tooth narrower than long) and
 hysteronotum (dorsosejugal apodeme adaxial relative
 to seta j2, humeral tectum not obscuring bothridial
 base) pointed (Fig. 1). Foramen F4 behind line joining
 setae Z4-S5. Major axis of pore *Saf* nearly
 longitudinal (similar to Fig. 8).....*P. acutinatata* sp. nov.
 Front of rostrum (tooth as wide as long) and
 hysteronotum (dorsosejugal apodeme adaxial margin
 level with seta j2, humeral tectum obscuring bothridial
 base) blunt (Fig. 5). Foramen F4 in front of line
 joining setae Z4-S5. Major axis of pore *Saf* nearly
 transverse (Fig. 6).....*P. obtusinatata* sp. nov.

***Paraphauloppia acutinatata* sp. nov.**

FIG. 1.

Type material: Holotype female (SAMA N1990733), plant litter, sparse moss and calcareous sandy soil, under ridge-fruited mallee (*Eucalyptus incrassata*) amongst broombush shrubs (*Melaleuca uncinata*), open scrubland, Ferries-McDonald Reserve ($35^{\circ}15'S$, $139^{\circ}09'E$), 20.vi.1974. Paratypes, four ♀♀ (SAMA, N1990734 - N1990737) and four ♂♂ (SAMA, N1990738 - N1990741), same data as holotype.

Female: Soma oval, light brown. Idiosomal length, 316 (5, 298-329). Leg lengths (femur-tarsus for 316): I-169, II-142, III-142, IV-180. Tibial maximum heights (for 316): I-17, II-12, III-11, IV-12.

Proteronotum with terminal tooth to rostrum forming narrow point, not as broad as long. Anterior foramen (F1) absent. Seta j2 reaching midway between j1-z1. Sensory seta (z2) clavate, usually with caput longer (over 66% of total setal length) than exposed stalk. Hysteronotum with mainly medium length setae, but some peripheral setae substantially longer, Z1 usually longer than z2, S6 usually $1.25 \times$ length of Z4. Seta S5 well forward so that level with seta Z4 and foramen F4 behind line between Z4-S5.

Idiosternal setae with inconspicuous cilia, long, seta j2 reaching anterior margin of sternal tectum. Coxite region striated from anterior margin back to seta Sg1, posteriorly striae superimposed on weak reticulations. Discoidal ridge with straight edge. Slit-like pore *Saf* nearly longitudinal, less than 45° from longitudinal axis. Egg subellipsoidal, exochorion smooth, size 170×77 (1), length 52% of somal length, eggs per female - 1 (1).

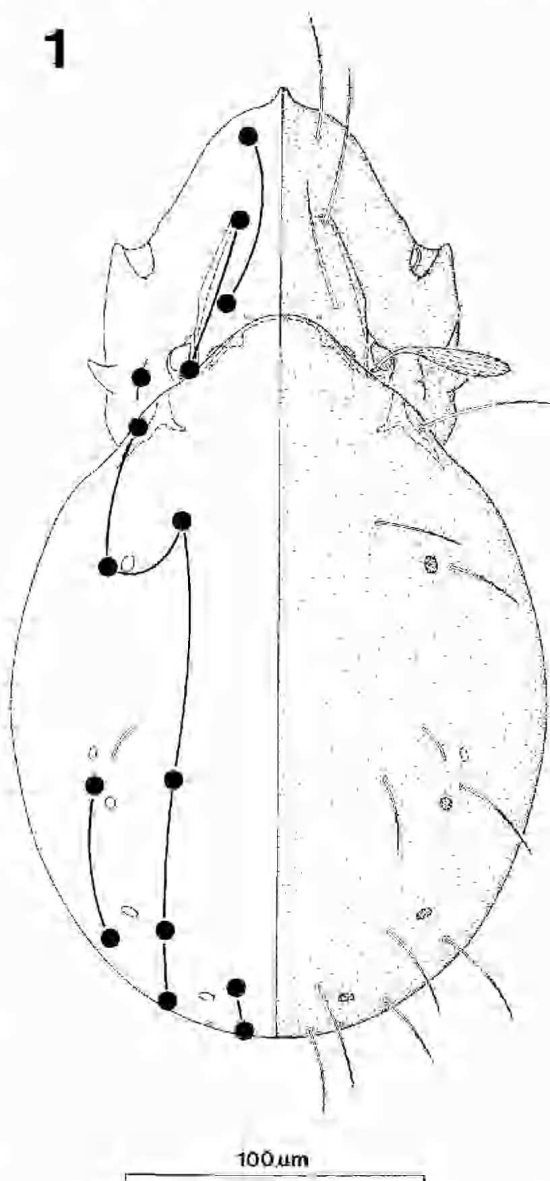
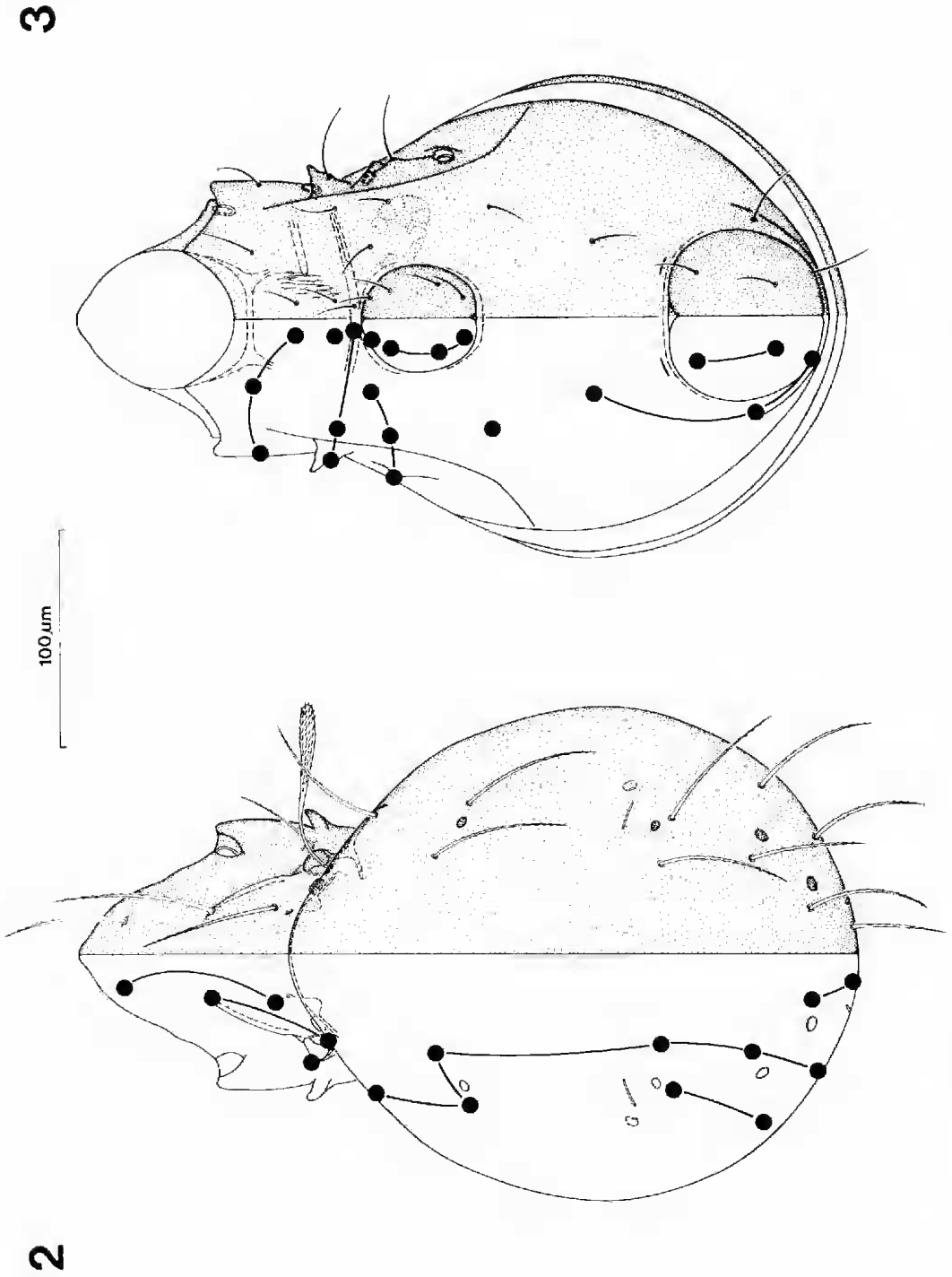


Fig. 1. *Paraphauloppia acutinatata* sp. nov., ♀ notum of soma. For setal notation see Fig. 5.

Legs medium length (mean femur-tarsus length: 50% of somal length) with medium girth (mean maximum tibial height 34% of mean length). Central pretarsal claw with $2 \times$ depth of lateral pretarsal claws.

Male: Similar to female but idiosoma shorter, mean length, 285 (4, 275-296).

Remarks: The specific name *acutinatata* is derived from the Latin for 'pointed' and 'back' and refers



Figs 2-3. *Paraphauloppia globata* sp. nov., ♀ 2, notum of soma. 3, sternum of soma. For setal notation see Figs 5 and 6.

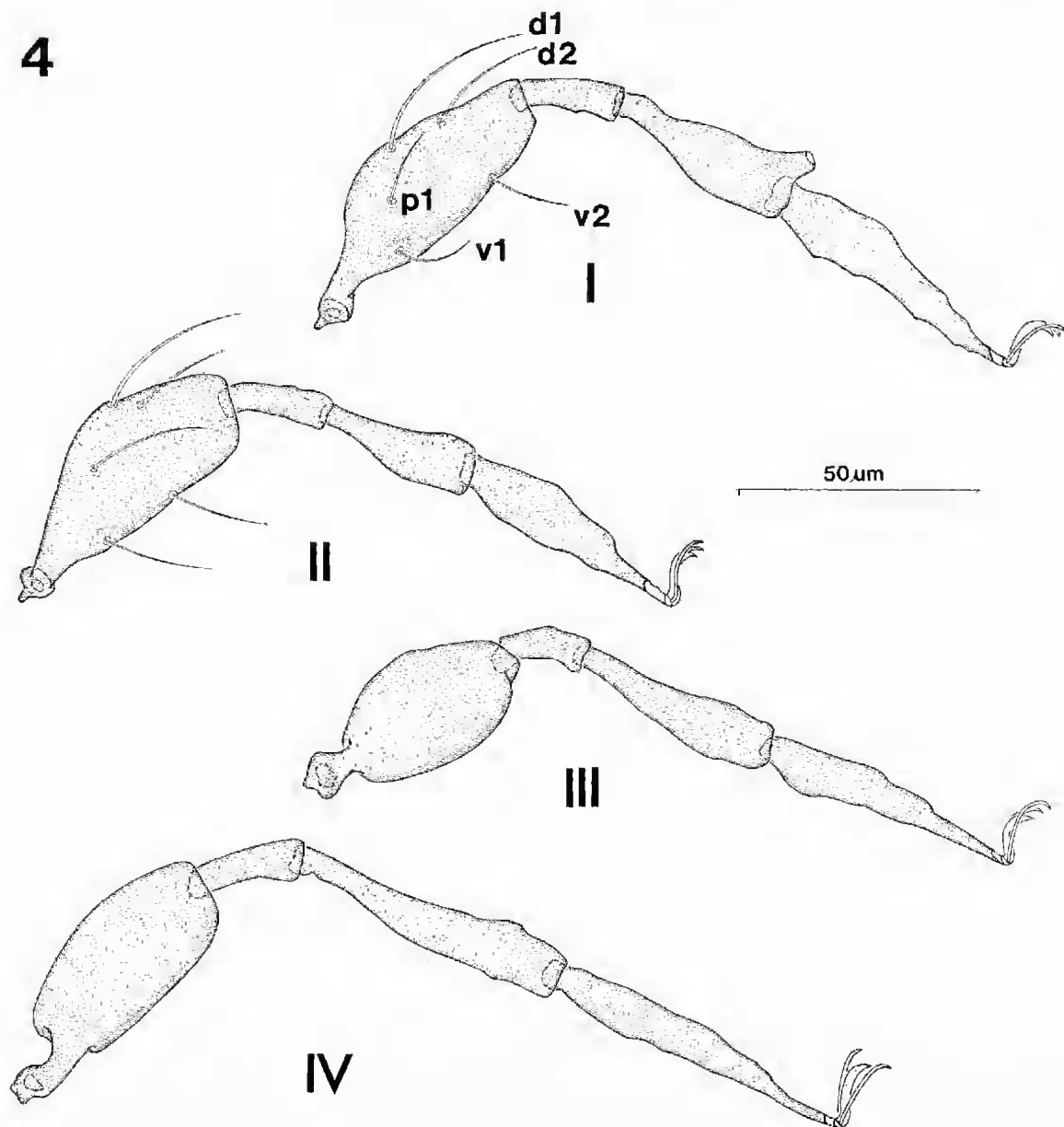


Fig. 4. *Paraphauloppia globata* sp. nov., ♀, posterior aspect of femur-pretarsus of right legs I, II, III and IV. all setae in femora I and II illustrated, d - dorsal, p = posterior, v = ventral.

to the sharp rostral tooth and anterior hysteronotal margin. These distinguish it from the similar *P. obtusinotata*, sp. nov. as do the longitudinal slit-like pore *Saf* and greater length of some peripheral notal setae. *P. acutinotata* and *P. obtusinotata* both have medium sized hysteronotal setae and are distinguishable from the other Australian species which have either clearly longer or shorter relevant setae.

***Paraphauloppia globata* sp. nov.**

FIGS 2-4

Type material: Holotype female (SAMA N1990742), plant litter, sparse moss and calcareous sandy soil, under ridge-fruited mallee (*Eucalyptus incrassata*) amongst broombush shrubs (*Melaleuca uncinata*), open scrubland, Ferries-McDonald Reserve (35°15'S, 139°09'E), 20.vi.1974. Paratypes, 16 ♀ ♀

(SAMA, N1990743 - N1990752; 1-BMNH; 1-FMNH; 1-NZAC; 3 lost) and five ♂♂ (SAMA, N1990753 - N1990756; 1 lost), same data as holotype.

Female: Soma broadly oval or subspherical in shape, light brown colour. Idiosomal length, 365 (17, 339-365). Leg lengths (femur - tarsus for 365): I-213, II-193, III-188, IV-239. Tibial maximum heights (for 365): I-21, II-16, III-14, IV-16.

Proteronotum with terminal tooth to rostrum forming narrow point, not as broad as long (in Fig. 2 not evident because directed downwards). Anterior foramen (F1) absent. Seta j2 reaching anterior to z1 to about $0.8 \times$ distance between setae j1 - z1. Sensory seta (z2) clavate, slim and long, usually with caput subequal in length to exposed stalk. Hysteronotum with long setae, length of setae Z3 and Z4 more than $2 \times$ distances from Z2 and S5 respectively. Seta S5 nearly far enough forward to be level with seta Z4, but foramen F4 anterior to line between setae Z4-S5.

Idiosternal setae with minute but noticeable cilia, long seta J2 reaching anterior margin of sternal tectum. Coxite region with central area striated from anterior margin to seta III/1, laterally around seta J2 lines faint and broken up into rows of short striae and dots. Discoidal ridge with tubercle bearing seta IV3. Slit-like pore Saf nearly transverse, more than 45° from longitudinal axis. Egg subellipsoidal, exochorion rugose, mean size 166×80 (10), length 47% of somal length, eggs per female - 1 (1), 2 (1), 3 (3) or 4 (2).

Legs long (mean femur-tarsus length: 57% of somal length) and slim (mean maximum tibial height 31% of mean length). Central pretarsal claw with $2 \times$ depth of lateral pretarsal claws.

Male: Similar to female but idiosoma shorter, mean length 342 (5, 337-347).

Remarks: The specific name *globata* is derived from the Latin for 'globe' and refers to the subspherical shape of the hysteronotum. *P. globata* is distinguishable from the other Australian species by this shape, its relatively large size and long notal setae. It is smaller than all but one of the South American species, and differs from them in having such a long clavate sensory seta (z2).

Paraphauloppia novaezealandica Hammer

Paraphauloppia novaezealandica Hammer, 1967, p. 45, 46, fig. 59.

Type material examined: Of 11 specimens recorded with original description, lectotype ♂ (labelled "type" in vial of alcohol) and four paralectotypes (labelled "paratypes", one ♀ and three ♂♂ on one

slide) examined (ZMC), thick moss and bone-dry lichens and *Lycopodium*, open *Mumuk* and *Nothofagus* forest, few 100 feet above lake, Lake Rotoiti, South Island, New Zealand, M. Hammer, 1962.

Female: Soma oval, straw colour (New Zealand specimens) or light brown (South Australian specimens). Idiosomal length (original description: "about 0.34mm"), 320 (1, New Zealand), 337 (25, Sclerophyll forest, 326-346) or 363 (5, Savannah woodland, 350-370). Leg lengths (femur-tarsus, Sclerophyll forest, for 341): I-170, II 151, III-142, IV-178. Tibial maximum heights (for 341): I-19, II-17, III-12, IV-12.

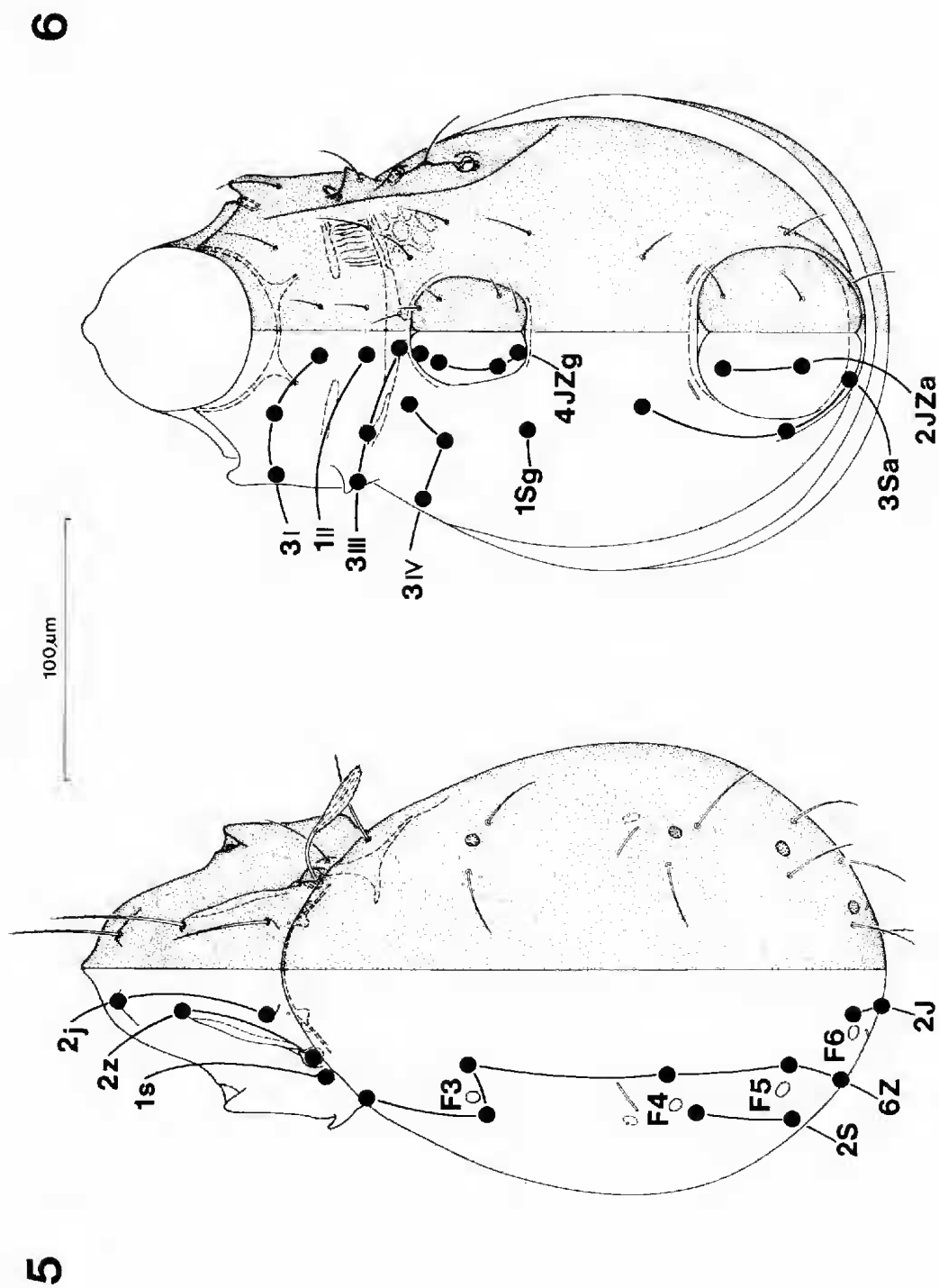
Proteronotum with terminal tooth to rostrum forming broad point, as broad as long (not illustrated by Hammer, 1967: fig 59). Anterior foramen (F1 = "ap") small but conspicuous. Short ridge between setae j2-z2 present (New Zealand specimens) or absent (South Australian specimens). Seta j2 as long as $0.75 \times$ distance between setae j2-z1. Sensory seta (z2) globular, with caput subequal to or shorter than exposed stalk, two parts clearly delineated. Anterior hysteronotal margin complete, although faint, recognisable between dorsocentral apophyses. Hysteronotum with short setae, Z1, Z2 and Z4 length subequal to distance Z2-Z3. Seta S5 well posterior to seta Z4, and nearly directly behind it, so foramen F4 lateral to line between setae Z4-S5.

Idiosternal setae with inconspicuous cilia, medium length, seta J2 not reaching anterior margin of sternal tectum. Coxite region not striated, weak reticulations near midsternum. Apodeme III present, small, thickened fusion to coxite limited to short linear strut or sub-circular tubercle. Discoidal ridge with tubercle bearing seta IV3. Slit-like pore Saf nearly longitudinal, less than 45° from longitudinal axis. Egg subellipsoidal, exochorion smooth, mean size 145×86 (11), length 46% of somal length, eggs per female - 1 (9), 2 (1) or 3 (1).

Legs medium length (mean femur-tarsus length: 47% of somal length) with medium girth (mean maximum tibial height 34% of mean length). Central pretarsal claw with $2 \times$ depth of lateral pretarsal claws.

Male: Similar to female but idiosoma usually shorter, mean length, 328 (4, types ex New Zealand, 320-334), 323 (25, Sclerophyll forest, 312-336) or 341 (6, Savannah Woodland, 326-355).

Referred material: 41 ♀♀ (SAMA N1990939 - N1990945, N1990955 - N1990964, N1990981 - N1990992, 4-BMNH, 4-FMNH, 4-NZAC) and 50 ♂♂ (SAMA N1990934 - N1990938, N1990946 - N1990948, N1990965 - N1990980, N1990993 - N19901006, 4-BMNH, 4-FMNH, 4-NZAC), plant litter, sparse moss and calcareous sandy soil, under



Figs 5-6. *Paraphauloppia obtusinotata* sp. nov., ♀ 5, notum of soma. 6, sternum of soma.

sclerophyllous shrubs amongst mossmate stringybark (*Eucalyptus obliqua*), dry sclerophyll forest near summit of Mt Lofy (34°59'S, 138°45'E), Cleland Conservation Park, 9.v.1974. Five ♀♀ (SAMA N1990949 - N1990951, N19901007, N19901008) and six ♂♂ (SAMA N1990952 - N1990954, N19901009 - N19901011), grass, moss, leaf litter and loamy soil under manna gum trees (*Eucalyptus viminalis*), savannah woodland, Chambers Gully (34°58'S, 138°41'E), Cleland Conservation Park, 12.vi.1974.

Remarks: *Paraphauloppia novaezealandica* is distinguishable within the genus by the presence of foramen F1 and only three pairs of JZg setae on the genital shields. The South Australian material is more like New Zealand type specimens than the original description indicates, in that the anterior margin of the hysteronotal shield is complete, the notal setae are longer and the rostrum has a tooth. Two small differences, the larger soma and the absence of a short proteronotal ridge on the Australian material, however, suggest that there may be two subspecies present. *P. novaezealandica* is superficially similar to *P. obtusinotata* sp. nov., but is distinguished from it and other South Australian species, by its generically unique character states and in having a globular sensory seta and no striae on its coxites. The most similar species to it is *P. gracilis* (Hammer, 1958) from Bolivia, which also shares the positioning of hysteronotal seta S5, well separated from Z4, but directly behind it.

***Paraphauloppia obtusinotata* sp. nov.**

FIGS 5, 6

Type material: Holotype ♀ (SAMA N1990757), plant litter, sparse moss and siliceous sandy soil, under sclerophyllous shrubs amongst mossmate stringy bark (*Eucalyptus obliqua*), dry sclerophyll forest, near summit of Mt Lofy (34°59'S, 138°45'E), Cleland Conservation Park, 9.v.1974. Paratypes, 105 ♀♀ (SAMA, N1990758 - N1990773 and N1990785 - N1990858; 5-BMNH; 5-FMNH; 5-NZAC) and 101 ♂♂ (SAMA N1990774 - N1990784 and N1990859 - N1990933, 5-BMNH, 5-FMNH, 5-NZAC), same data as holotype.

Female: Soma with oval shape and light brown colour. Idiosomal length, 308 (25, 278-329). Leg length (femur-tarsus for 288): I-155, II-149, III-142, IV-168. Tibial maximum heights (for 288): I-19, II-14, III-14, IV-12.

Proteronotum with terminal tooth to rostrum forming broad point, as broad as long. Anterior foramen (F1) absent. Seta J2 length subequal to distance J2-Z1. Sensory seta (z2) clavate, medium size with caput subequal in length to exposed stalk. Hysteronotum with medium length setae, some peripheral setae slightly longer, Z1 shorter than z2,

S6 subequal in length to Z4. Seta S5 posterior to seta Z4 so foramen F4 just anterior to line between setae Z4-S5.

Idiosternal setae with inconspicuous cilia, long, seta I2 reaching anterior margin of sternum. Coxite region with striations broken up into short lines or dots, from anterior margin to ventrosejugal apodeme, not superimposed on posterior reticulations. Discoidal ridge with tubercle at base of seta IV3. Slit-like pore Suf nearly transverse, more than 45° from longitudinal axis. Eggs ellipsoidal, exochorion smooth, mean size 139 × 70, length 48% of somal length, eggs per female - 1 (9), 2 (6) or 3 (2).

Legs long (mean femur-tarsus length: 53% of somal length) with medium girth (mean maximum tibial height 38% of mean length). Central pretarsal claw with 2× depth of lateral pretarsal claws.

Male: Similar to female but idiosoma shorter, mean length, 293 (25, 278-293).

Remarks: The specific name *obtusinotata* is derived from the Latin words for 'blunt' and 'back' and refers to the broad rostral tooth and rounded anterior hysteronotal margin, which distinguishes it from the similar *P. acutinotata* sp. nov. Other distinguishing characters are the longitudinal slit-like pore Suf and the shorter peripheral hysteronotal setae. *P. obtusinotata* and *P. acutinotata* are medium sized amongst other Australian species which have either clearly longer or shorter hysteronotal setae.

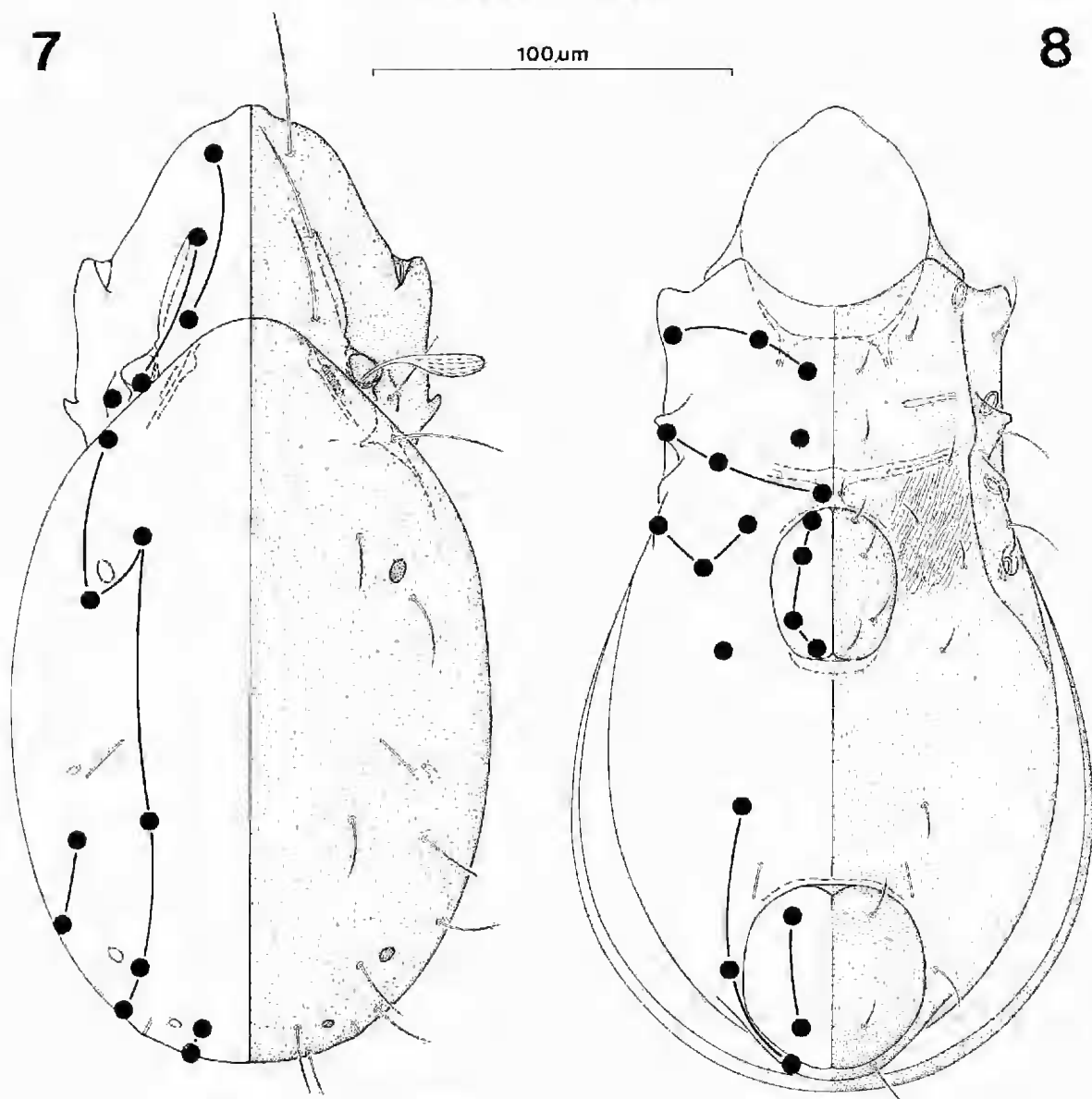
***Paraphauloppia triforata* sp. nov.**

FIGS 7, 8

Type material: Holotype ♀ (SAMA N19901012), plant litter and calcareous sandy soil, under banksia shrubs (*Banksia ornata*) amongst sclerophyllous shrubs and sparse brown stringy bark mallee (*Eucalyptus baxteri*) on ridge, tall open-shrubland, Tamboore (35°57'S, 140°29'E), 4.vii.1974. Paratypes, 12 ♀♀ (SAMA N19901013 - N19901024) and eight ♂♂ (SAMA N19901025 - N19901032), same data as holotype.

Female: Soma narrowly oval, straw colour. Idiosomal length, 279 (13, 270-288). Leg length (femur-tarsus for 278): I-137, II-127, III-108, IV-144. Tibial maximum heights (for 278): I-17, II-12, III-10, IV-10.

Proteronotum with terminal tooth to rostrum forming broad point, as broad as long. Anterior foramen (F1) absent. Seta J2 reaching just beyond seta Z1. Sensory seta (z2) clavate, medium size, caput subequal in length to exposed stalk. Hysteronotum with short setae, Z3 and Z4 length less than distance



Figs 7-8. *Paraphauloppia triforata* sp. nov., ♀ 7, notum of soma. 8, sternum of soma. For setal notation see Figs 5 and 6.

from Z2 and S5 respectively. Seta S5 almost level with seta Z4, and foramen F4 absent.

Idiosternal setae with short, distinct cilia, short seta I2 not reaching anterior margin of sternum. Coxite region with striations reaching back posteriorly to seta IV2, anterior striae longitudinal, whilst posterior to ventrosejugal apodeme striae angle towards genital shield. Discoidal ridge straight. Slit-like pore *Saf* nearly longitudinal, less than 45° from longitudinal axis. Egg subellipsoidal, exochorion smooth, mean size 131 × 66, length

47% of somal length, eggs per female - 1 (4), 2 (3) or 3 (2).

Legs medium length (mean femur-tarsus length: 46% of somal length) with medium girth (mean maximum tibia height 37% of mean length). Central pretarsal claw only slightly greater in depth than lateral pretarsal claws.

Male: Similar to female but idiosoma shorter, mean length, 264 (8, 259-270).

Remarks: The specific name *triforata* is prefixed by

a derivation of the Latin for 'three' and refers to presence of only three pairs of hysteronotal foramina, a state unique in *Paraphauloppia*. *P. triforata* is the smallest member of the genus, and is pale in colour with relatively short legs.

Acknowledgments

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